

SOME NEW DICYRTOMA AND KEY TO KNOWN SPECIES OF THE UNITED STATES. (COLLEMBOLA, SMINTHURIDAE).

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Some interesting forms of *Dicyrtoma* have been found during the course of collecting in North Carolina and it is the purpose of this paper to describe these new forms and to point out some of the structural complexities involved among the species of this genus described so far from the United States.

Three new species and one new variety are described, namely, *Dicyrtoma ochreous*, *D. mithra*, *D. curvilineata*, and *D. hageni* variety *vinalis*. Other species in the key and discussed are: *D. hageni* Folsom, *D. frontalis* Banks, and *D. quadangularis* Mills.

Genus *Dicyrtoma* Bourlet, 1843
Papirius Lubbock, 1862, ad p.

This genus is separated from the other genera of the subfamily Dicyrtominae Börner by the claw being without a tunica, dentes possessing large serrate setae dorsally, and the 3rd and 4th antennal segments not subsegmented.

In making a key the structural similarities of the forms were soon recognized. In the mucro there is only a slight difference in the number of teeth of the serrated margins. There is a difference in the subapical filament of the unguiculus, whether apically knobbed or not, and in length. There is some difference in the dentation of the unguis and in arrangement of the setae of the dentes. Some difference was noted in the subanal female appendage. Otherwise, the color pattern and size are used as separable characters.

KEY TO SPECIES OF DICYRTOMA KNOWN FROM THE UNITED STATES.

1. Subapical bristle of unguiculus distinctly knobbed at apex, extending beyond end of unguis; unguis with one distinct tooth on its inner margin 2
 - Subapical bristle of unguiculus not knobbed at apex, shorter than above, reaching only to end of unguis; unguis with two distinct teeth on its inner margin 6
2. Color pattern in the form of longitudinal stripes and spots; length 0.75 mm. *curvilineata* n. sp.
 - Color pattern not as above 3

3. Head entirely white; abdomen blackish-purple with posterior dorsal pattern of yellowish-brown; length up to 1.5 mm.
hageni Folsom
Head pigmented; abdomen with different color pattern 4
4. Head pigmented only around eye-spots or vertex.
hageni var. *vinalis* n. var.
Head pigmented entirely or banded 5
5. Head banded with 2 broad, brownish-black bands; length up to 1.2 mm. *frontalis* Banks
Head not banded, but pigmented orange-ochreous all over; abdomen orange-ochreous all over with pearly spots dorsally and laterally; length 1.5 mm. *ochreous* n. sp.
6. Length 1.6 mm.; dens with 3 appressed ventral hairs distally; antennae white, but for pigment near elbow; head deep blue but for oral region; body blue with irregularly diamond-shaped white area dorsally *quadangularis* Mills
Length 1.0 mm.; dens with 4 appressed ventral hairs distally; head and body reddish-orange, dorsum lighter, and color pattern a mosaic of light and dark colored round areas and spots *mithra* n. sp.

Dicyrtoma ochreous, n. sp. (Figs. 1-7)

Length up to 1.5 mm. General color orange-yellow with white or pearly spots in the following color pattern (Fig. 1). Head yellow with a large white spot around eye-spot and smaller ones on cheeks; antennae light yellow at base grading to dark brown-purplish at apex; body orange-yellow, darker dorsally and posteriorly on abdomen, with 4 to 6 white spots dorsally and one to two laterally; several small spots ventrally on body; legs orange-yellow with a white spot on both posterior coxae and femur; furcula light yellow basally becoming pale apically; three large white spots ventrally at base of furcula.

Eyes 8 on each side on a black eye-spot (Fig. 6). Antennae longer than head or as 57:35. Relative lengths of antennal segments as: 4:23:22:8. Ant. 3 and 4 not subsegmented and with definite whorls of hairs. Unguis (Fig. 4 and 5) without a tunica, rather straight, pointed, with an inner tooth one-fourth the distance from the apex, and a pair of distal outer teeth. Unguiculus (Fig. 4 and 5) with an inner basal tooth and a long strongly knobbed subapical filament reaching beyond the apex of the unguis. Tenent hairs absent. Dentes three times length of mucro, with two rows of dorsal setae; with the inner row of 4 outstanding long spines, and

an outer row of 6 serrate setae, one simple spine basally on lateral margin; 4 appressed ventral spines distally. Mucro (Fig. 2) with coarse serrate teeth on both edges. Subanal appendages of female (Fig. 3) curving, spinelike.

Heavy, short spinelike hairs on front of head and vertex. A few short simple reclinate hairs on front of body, dorsum of abdomen in the specimens examined nearly naked. Posterior part of abdomen with short spinelike hairs similar to head. Ano-genital segment with longer and more spinelike setae. Legs with short hairs basally becoming longer and more spinelike on tibio-tarsi. Posterior tibio-tarsi with 2 heavy pinnate bristles as in *Ptenothrix unicolor*. Body integument finely tuberculate. Corpus of tenaculum with one short apical bristle. At least 3 postero-lateral bothriotrichia situated as in figure 7.

Specimens taken in leaf mould from a hardwood forest at the edge of Lake Raleigh, Raleigh, North Carolina, October 29, 1943, D. L. Wray and C. S. Brimley. Cotypes in N. C. D. A. Insect Collection.

Dicyrtoma mithra, n. sp. (Figs. 8-18)

Length up to 1 mm. General color variable in different specimens, from yellowish to reddish-orange to purplish. Antennae light purple basally, deep purple distally. Head reddish-orange to light purplish, with black eyespots and two blackish, ocelli-like spots on front between bases of antennae. Body reddish-orange to purplish with the dorsum lighter and with an indication of an anterior dorsal light streak in some darker specimens. The color pattern (Fig. 8, which is the darker form) on dorsum and sides of body in the form of a mosaic, with an intermingling of dark purplish and light orange round areas and spots. Legs orange to light purplish. Furcula light orange-purplish basally and pale distally.

Eyes 8 on each side on a black eyespot (Fig. 9). Antennae longer than head or as: 31:25. Relative lengths of the antennal segments as: 3:11:13:5. Ant. 3 and 4 not subsegmented; ant. 3 with at least 4 sensory protuberances, each with a single straight sense spine; ant. 4 with about 6 whorls of hairs of somewhat reclinate hairs. Unguis (Fig. 11 and 12) with two teeth on the inner margin and one on outer margin. Unguiculus (Figs. 11 and 12) lanceolate with a basal spine and an apical unknobbed bristle extending to apex of unguis. Tenent hairs absent. Dentes to mucro as 13:4; with 2 dorsal rows of mostly serrate setae, inner row of 4 simple, long, setae, the distal and proximal ones being the

longest; outer row consisting of 6 serrate spines and an extra one near base of mucro; one simple spine basally on lateral margin; 4 appressed ventral hairs on distal half (Fig. 10).

Mucro (Fig. 10) with coarse serrate teeth on both edges, cleft apically. Subanal appendages of female (Fig. 15) only slightly curving, spinelike.

Heavy, short, spinelike hairs on front and vertex of head; short, recurving hairs anteriorly on dorsum of body, becoming short stout, spinelike on posterior fourth of dorsum; anal papillae with stout, straight, spinelike hairs, and longer, curving slender hairs. Body integument finely tuberculate. Three postero-lateral bothriotrichia situated as in figure 18.

Taken in hardwood forest leaf mould at edge of Lake Raleigh, Raleigh, North Carolina, January 9 and 26, 1943, D. L. Wray and C. S. Brimley 2 specimens; 30 specimens taken at same place, January 9, 1948, DLW. Cotypes in NCDA Insect Collection.

Dicyrtoma curvilineata n. sp. (Figs. 19-24)

Length up to 0.75 mm. General color yellowish-white with purple irregularly margined stripes and spots dorsally in the following pattern:—one purple stripe beginning at base of antenna extends downward to cheek where a short fork extends slightly ventrally, the main stripe extends thence from the fork postero-laterally on the head toward the body where it becomes a broad lateral stripe which extends entirely around body and back to other cheek. Another stripe begins half way of body and extends posteriorly around abdomen and back to midway of body. The third stripe is situated dorsally on the body, the anterior ends weakly joined (separate in some specimens); both forks extend posteriorly to within one fourth of distal end of abdomen. A short purplish streak extends from the base of each eyespot posteriorly. On the front of head is a central purple spot containing two ocelli-like round black spots. Venter of head, body, legs, furcula yellowish-white. Antennae light purplish throughout (Figs. 19 and 20).

Eyes 8 on each side on black eyespots. Antennae longer than head or as: 43:30. Relative lengths of antennal segments as 4:14:20:5. Ant. 3 and 4 not subsegmented, with the 4th bearing definite whorls of hairs and an apical short, stout, distally bent sensory rod. Unguis (Fig. 23) rather straight and pointed, with one tooth on the inner margin one fourth from distal end, and two outer teeth near the middle. Unguiculus bearing a small inner spine and a knobbed subapical bristle, which extends slightly beyond the

apex of unguis. Tenent hairs absent. Dentes three times length of mucro, with 2 dorsal rows of setae; outer row consisting of 3 proximal simple setae and 5 serrate setae on distal half; with a lateral subapical bristle; 4 appressed ventral setae on distal half and a small short one at proximal end; and with 4 long setae on inner row. Mucro (Fig. 24) with both margins serrate, with about 26 serrations on inner margin. Rami of tenaculum (Fig. 21) tridentate, anterior lobe with 3 setae. Subanal appendages of female (Fig. 22) spinelike, curving distally.

Short stout bristles on front and vertex of head; smaller curving bristles on anterior of body, becoming short and stout on posterior end; anal segment with very heavy, broad spines dorsally. Lateral hairs of body fine and long.

Cotypes taken in leaf mould, Erwin, N. C. November 6, 1946, D. L. Wray; Hillsboro, North Carolina, Oct. 26, 1948, in leaf mould near Eno River, D. L. Wray. Cotypes in NCDA Insect Collection.

Dicyrtoma hageni var. *vinalis* n. var. (Figs. 29-33)

Structurally this form is similar to *D. hageni* Folsom, however, it differs in having fewer mucronal teeth, longer and more curving subanal female appendage, and mostly in color pattern. In *D.H. vinalis* the body is entirely wine red in color both dorsally and ventrally, while in *D. hageni* the venter of the body is not colored and the first segment of body is unpigmented (Figs. 25 and 29).

Length 1.0 mm. Head yellowish except for a vinaceous colored patch around each eyespot. Body deep rich wine red color both dorsally and ventrally. Legs and furcula yellow. First two antennal joints light, last two vinaceous. Eyes 8 on each side on light vinaceous eyespots. Antennae to head as 33:23. Relative lengths of antennal joints as: 3:11:14:4. Ant. 3 and 4 not subsegmented, with the 4th bearing definite whorls of hairs. Unguis (Fig. 30) rather straight and pointed with an inner tooth one fourth from distal end and two outer teeth. Unguiculus bearing a small inconspicuous inner spine and a distinctly knobbed subapical bristle which extends beyond apex of unguis. Tenent hairs absent.

Dentes three times length of mucro, with 2 dorsal rows of setae, the outer comprised of 2 basal simple setae and 5-6 serrate setae; 4 long setae on inner row; 4 repressed ventral setae on distal half. Mucro (Fig. 31) with both margins serrate, with 18-20 teeth on inner margin. Subanal appendage of female (Fig. 33) spinelike,

long, curving distally. Short erect simple setae posteriorly on abdomen.

Wilmington, North Carolina, March 23, 1943, taken in leaf mould, from pine woods, D. L. Wray. In NCDA Insect Collection.

Dicyrtoma hageni Folsom. (Figs. 25-28)

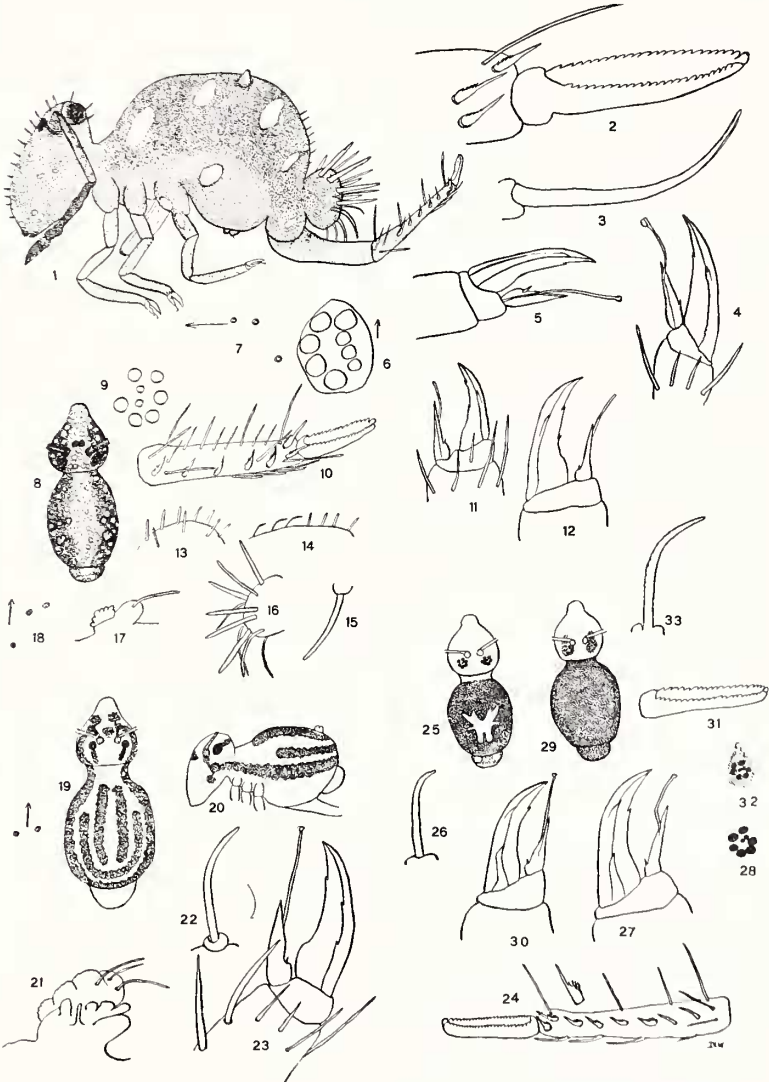
The specimens of this species taken were much smaller than given by Folsom, averaging 1.0 mm. in length, whereas he gives 1.5 mm. Taken in coastal areas so far: Castle Hayne, N. C., March, 30, 1943, in leaf mould, D. L. W.; Vanceboro, N. C., Nov. 16, 1946, leaf mould, D. L. Wray.

Dicyrtoma frontalis Banks, 1903

This distinct and well marked species was taken at Raleigh, N. C. January 26, 1944, by D. L. Wray and C. S. Brimley, from rotten grass at edge of Lake Raleigh. I have compared these specimens with the type in the Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts. It is interesting to note that this probably is the first recovery of this interesting species since the original collection in Washington, D. C. in 1903 by Banks.

EXPLANATION OF PLATE IV

Dicyrtoma ochreous, n. sp. FIG. 1. Lateral view of body. 2. Mucro. 3. Female subanal appendage. 4. Left fore foot. 5. Left hind foot. 6. Left eyespot. 7. Lateral abd. bothriotrichia left side. *Dicyrtoma mithra*, n. sp. 8. Dorsal view. 9. Left eye. 10. Dens-mucro. 11. Left hind foot. 12. Left middle foot. 13. Spines on head. 14. Spines on posterior abdomen. 15. Female subanal appendage. 16. Lateral view anal segment showing spines. 17. Dorsal protuberance on posterior part of abdomen. 18. Position of bothriotrichia on lateral side of body. *Dicyrtoma curvilineata*, n. sp. 19. Dorsal view color pattern. 20. Lateral view color pattern. 21. Tenaculum and papillae. 22. Female subanal appendage. 23. Left hind foot. 24. Dens-mucro. *Dicyrtoma hageni* Folsom. 25. Dorsal view color pattern. 26. Subanal appendage of female. 27. Hind foot. 28. Eyespot. *Dicyrtoma hageni* variety *vinalis* new variety. 29. Dorsal view color pattern. 30. Left hind foot. 31. Mucro. 32. Eyespot. 33. Subanal appendage of female.



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LITERATURE USED AND CITED

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- . 1934. Redescriptions of North American Sminthuridae. Iowa State College Journal of Science, vol. VIII, no. 4, pp. 461-511. (Redescribes *Papirius hagenii* Folsom under *Dicyrtoma hageni* Folsom).
- Mills, Harlow B.** 1934. A Monograph of the Collembola of Iowa. Collegiate Press, Inc., Ames, Iowa, 143 pp., 12 Pls. (Describes *Dicyrtoma quadangularis* Mills).

Rhagionidae (Diptera) from the Great Smoky Mountains National Park. Five species of this family were collected by the writer and Robert R. Dreisbach in the Tennessee part of the park in 1946: *Chrysopilus connexus* Jns., Elkmont, June 15, 2 ♀♀; *C. ornatus* Say, Cherokee Orchard, June 14, ♀; *C. quadratus* Say, Elkmont, June 15, ♀; *C. rotundipennis* Lw., Cades Cove, June 13, ♂; *Rhagio vertebratus* Lw., Cherokee Orchard, June 11, Chimneys Camp, June 11, Headquarters, June 15, 3 ♂♂, 3 ♀♀. It is interesting to note that the only form found in Cades Cove (*Chrysopilus rotundipennis*) has a costal plains distribution. *Chrysopilus connexus* is apparently known only from the North Carolina mountains and Jacksonville, Florida. The others are more widespread.

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